Claim 3 has been re-written as Claim 15 to specifically highlight the uniqueness of the invention in that it does not require the user to provide any test vectors to perform boundary scan operations.

Claim 4 has been re-written as Claim 16 to specifically highlight the uniqueness of the invention in that it does not require the user to provide any test executives to perform boundary scan operations.

Claim 17 has been added to clarify that the invention does not require the use of target programs.

Claim 9 has been re-written as Claim 22 to remove the relative and indefinite terms.
Claim 7 has been re-written as claim 20 to clarify the claim.

**The Rejection of Claims 1 and 12 On Mulrooney and "JTAG Visualizer Makes Boundary Scan ..." is Overcome**

The last O.A. rejected independent **Claims 1 and 12** on Mulrooney and a press release by JTAG Technologies.

Applicant requests reconsideration of this rejection for the following reasons:

(1) Both references rely on target programs, test executives and/or test vectors to operate. The present invention does not, per Claims 15, 16 and 17.

(2) Mulrooney relies on downloadable target programs to provide real-time feedback of parameters of interest to the user, it does not provide the boundary scan data to the user in real-time or otherwise.

(3) JTAG Visualizer provides color-coded responses of information derived from the boundary scan data (faults, etc) and the user provided netlists and test vectors. The present invention provides color-coded representations of the raw boundary scan data without the need for test vectors or netlists.

(4) There is no justification, in Mulrooney and JTAG Visualizer, or in any other prior art separate from applicants' disclosure, which suggests that these references be combined, much less combined in the manner proposed.

(5) The novel features of Claims 1 and 12 produce new and unexpected results and hence are unobvious and patentable over these references. The ability to directly monitor and control the raw boundary scan data via a graphical user interface is not suggested or taught by any prior art reference.

(6) If combined, the references would produce a machine that generates real time color coded data generated by target programs downloaded and run by the user – it would not teach the display of real-time boundary scan data of this invention.

(9) Even if combined, the references would not meet the claims of the present invention. Specifically:

(a) Neither prior art operates without test vectors, test executives or target programs per Claims 13, 14, 15, 16, and 17.

(b) Neither invention teaches the generation of virtual DUTs automatically built from BSDL files per Claim 24.

(c) Neither invention teaches the use of graphical controls to view and control the raw boundary scan data per Claims 19, 20, 21, 22, and 23.

(d) Neither invention teaches or suggests using the their methods to display the real-time raw boundary scan data of Claim 18.

**Claim 2** was rejected because JTAG Technologies teaches the capability of varying the graphics and colors of the displayed devices. Applicant requests reconsideration of this rejection for the following reasons:

(1) JTAG Technologies teaches the color-coding of the interpreted results derived from the raw boundary scan data and user provided test vectors and netlists. The present invention provides for color-coding of the raw boundary scan data itself without the need for test vectors and netlists and therefore produces new and unexpected results and hence are unobvious and

patentable over these objections.

**Claims 3 and 4** were rejected because "test vectors and test executives would be inherent in this type of testing, whether provided by a file containing these or by a test pattern generator etc." Applicant requests reconsideration of this objection for the following reasons:

(1) Per claims 14, 15 and 16, the present invention does not rely on user provided test vectors, test executives or target programs, thereby producing new and unexpected results and are hence unobvious and patentable over these objections.

**Claim 5** was rejected because Mulrooney teaches updating test status of the running tests. Applicant requests reconsideration of this objection for the following reasons:

(1) Mulrooney teaches the updating of data provided by a downloaded target program running on the DUT to provide status of running tests. The present invention provides real-time feedback on the boundary scan cells themselves and does not rely on downloaded target programs to retrieve the data.

**Claims 6 and 7** were rejected because Mulrooney teaches a GUI which user can see a displayed indication of current testing processes. Applicant requests reconsideration of this objection for the following reasons:

(1) Mulrooney teaches the updating of data provided by a downloaded target program to provide status of running tests. The present invention provides real-time feedback of the boundary scan cells themselves (not test results) and does not rely on downloaded target programs to retrieve the data.

**Claims 8 and 9** were rejected because Mulrooney teaches that the command line can be input from a configuration file ...
Applicant requests reconsideration of this objection for the following reasons:

(1) Claims 8 and 9 teach a method of controlling boundary scan data which is not suggested by Mulrooney or any of the prior art (the use of virtual controls to directly influence the boundary scan data).

**Review of Non-Applied References**

**U.S. Patent 6,629,282 Sugamori** – Describes an invention that requires the use of a test head and test module on which an integrated circuit can be mounted for high speed and low speed characterization per Claims 1, 2, 3 and 6.

It also teaches that test patterns must be generated and run on the tester modules per paragraph 3 of column 1 of the specifications and Claim 11, 12 and 13.

This reference does not teach the present method that requires no test vectors, test patterns, test executives or target programs; it does not teach the use of BSDL files for automatic virtual device generation; it does not teach the use of colorizing the raw boundary scan data; and it does not teach the use of boundary scan data for real-time circuit analysis.

**U.S. Patent 6,389,565 Ryan et al** – Describes an invention that requires the use of test vectors ("predicted frame cell data") per figure 3 and throughout the specification text and in Claims 1, 2, 4, 5, 6, and 7 in a static non real-time environment.
This is in contrast to the present invention that describes a machine that requires no test vectors (or predicted values) and displays graphical results in real-time while the target is running normally.

This patent also does not teach the method of generating virtual DUTs from BSDL files or the method of using graphical LEDs and pushbutton controls to monitor and control the boundary scan information.

**PATRIOT IEEE Journal Article, Wang et al -** This article teaches traditional boundary scan test methodology and specifically requires the use of test vectors (figure 4 on page 437, and paragraphs 7 and 8 on page 439) and is run on static configurations of the system under test – it is not done in real time while the system is running. It also does not teach the method of generating graphical DUTs from user supplied BSDL files.

This is in contrast to the present invention that describes a machine that requires no test vectors and displays graphical results in real-time while the target is running normally, where DUTs are created from user supplied BSDL files and boundary scan data is directly modified via graphical controls.

**A Structured Graphical Tool ... Cogswell et al** – Describes a traditional test vector oriented boundary scan test setup with the addition of color coding fault indications derived from the boundary scan information run on static target systems.
This is in contrast to the present invention that describes a machine that requires no test vectors and displays graphical results of the direct boundary scan information in real-time while the target is running normally, where DUTs are created from user supplied BSDL files and boundary scan data is directly modified via graphical controls.

**Corelis ScanPlus -** This is another traditional boundary scan test setup that requires the use of test patterns and is run on static systems under test. The results are displayed as color coded fault analysis, not as direct boundary scan data in real time.

This is in contrast to the present invention that describes a machine that requires no test vectors and displays graphical results of the direct boundary scan information in real-time while the target is running normally, where DUTs are created from user supplied BSDL files and boundary scan data is directly modified via graphical controls.

**Reconsideration for this invention is also requested for the following reasons:**

(1) **Commercial Success:** The invention has attained commercial success, it is currently distributed by multiple domestic and international sales organizations, and is licensed in over 25 countries. Refer to www.UniversalScan.com for the current embodiment of this invention, user feedback, and a list of current sales organizations and distributors of this invention.

(2) **Purchase Offers:** Others have tried to purchase or take a license under the invention.

(3) **Copying by Others:** Others have chosen to copy and implement the invention, rather than using the techniques of prior art, the XJAnalyser product at www.XJTAG.com for example is a European implementation of this invention.

(4) **Contrarian Invention:** The invention is contrary to the teachings of the prior art – that is, the invention goes against the grain of what prior art teaches. Prior art teaches that some combination of user provided test vectors, target programs and test executives, netlists, and/or schematics must be used to exercise boundary scan operations. The present invention does not require any of this and therefore produces new unexpected results.

(5) **Solution of Long-Felt and Unsolved Need:** The invention solves a long felt, long existing, but unsolved need – real-time access to boundary data without

the need for test vectors, test executives, target programs, schematics, or netlists to help debug modern electronic circuits.

(6) **Commercial Acquiescence:** The invention has been licensed to more than 500 users in over 25 countries, including potential competitors. The current embodiment of this invention can be viewed at www.UniversalScan.com.

(7) **New Principle of Operation:** Invention utilizes a new principle of operation. Applicant has blazed a new trail, rather than following one. Prior art teaches the use of test vectors to perform static tests on electronic circuits, this invention teaches that test vectors, test executives and target programs are not required to monitor and control boundary scan enabled devices, and teaches a new graphical method to monitor and control the boundary scan data.

(8) **Inability of competitors:** Competitors were unable to copy the invention until they were able to learn its details through a publication or reverse engineering of a commercial model; this indicates unobviousness.

**Conclusion:**

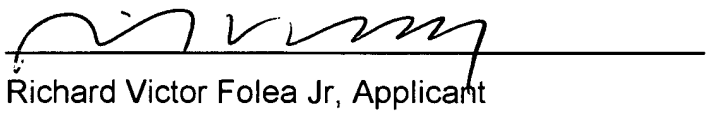
For all of the above reasons, applicant submits that the specification and claims are now in proper form, and that the claims all define patentability over the prior art. Therefore applicant submits that this application is now in condition for allowance, which action applicant respectfully solicits.

**Conditional Request For Constructive Assistance**

Applicants have amended the specification and claims of this application so that they are proper, definite, and define novel structure that is also unobvious. If for any reason this application is not believed to be in full condition for allowance, applicants respectfully request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. 2173.02 and 707.07(j) in order that the

undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,



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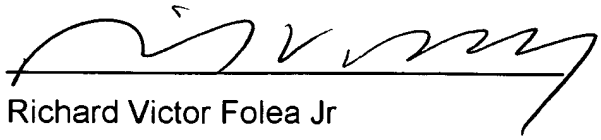

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